

Workshop Report – Tributary Watersheds

1. Work prior to workshop

Based on direction from staff of the Eastern Rivers and Mountains Network, an experienced team of three scientists was assembled to prepare a literature-based narrative that addressed conceptually, the structure and function of tributary watersheds, including stream, wetlands, and riparian components (Brooks et al. 2005). All members of the team contributed to the document which focused on tributary watersheds as holistic ecosystems.

When the document was in near final form, the three members of the team independently reviewed the preliminary list of 61 Vital Signs to develop a short list of candidates. The team compared the three lists and arrived at a consensus list of 18 candidate signs, including one new one that was not on the original list – digital soils data. These were ranked as highest or moderate priority to provide workshop participants with an indication of their relative importance. A 1-2 page narrative about each Vital Sign was prepared. Decisions about which Vital Signs were most important and relevant was based on the team's experience in working in these ecosystems coupled with a review of the literature. Selections were guided by the realization that potential Vital Signs must reflect the ecological integrity of these critically important ecosystems, and that they be realistically and efficiently measured. The team believed that an emphasis should be placed on the important biological endpoints, with supporting information about the physical, chemical, and landscape characteristics of tributary watersheds. The Vital Signs selected were designed to assess the condition of biological resources and to diagnose stressors of these resources.

Working with ERMN staff, a list of workshop invitees was developed. The conceptual narrative on tributary watersheds, the vital sign narratives, and a table of all 61 Vital Signs, with the pertinent ones for tributaries bolded, was provided to workshop participants prior to the May 2005 workshop in State College, Pennsylvania.

2. Workshop

At the opening session of the workshop, Brooks presented a brief Powerpoint presentation to all workshop participants that introduced tributary watershed concepts and listed the 18 potential Vital Signs on the short list. During the tributary watershed session, participants were introduced ($n=X$), and then each recommended Vital Sign was discussed individually. Participants were encouraged to provide reasons why each potential Vital Sign should be included in the final short list. The proposed list of 18 provided a focus for the discussions, but any other Vital Signs ($n=61$) on the overall list were eligible for inclusion. As long as at least one participant expressed a strong preference to include a Vital Sign on the evolving short list, it was included initially for further discussion.

After the new short list was assembled, a “straw vote” was held to determine the strength of support for all Vital Signs on the list. This “winnowed” list was then discussed further. Finally, participants voted in an open forum to establish a priority list of Vital Signs with rankings of 1, 2 or 3. This information was reported in the final general session at the end of the first day. The final list of recommended Vital Signs for tributary watersheds included 11 in the first tier, 8 second tier (with one new Vital Sign – Indicator Taxa), and 2 in the third tier, for a total of 21 (Table 1).

During the morning of the second day of the workshop, the tributary group re-visited the recommended list of 21 Vital Signs, and discussed possible methodology and measurement issues before adjourning. In addition, some effort was made to group selected Vital Signs into logical sub-groupings that should be sampled as a coherent unit. For example, participants suggested that Water Quality Core & Enhanced Parameters (16 & 17), Stream/River Channel Characteristics (7), and Aquatic Macroinvertebrates (39) should be sampled together as a suite. Thus, biological, chemical, and physical aspects would be sampled as a cohesive unit. Participants believed that this approach would mesh well with park unit programs tied to Clean Water Act requirements. The participants also grouped the landscape related Vital Signs (Land Cover/Land Use – 57, Landscape Pattern – 58) together because their measurements are intertwined, and there is no loss of efficiency in considering both simultaneously. These were considered essential for diagnosing stressors. There is a lack of hydrologic data for small streams and wetlands, so participants indicated that Surface Water Hydrology (13) and Wetland Hydrology (14) should be of high priority. This should be done by selecting representative examples of both types of aquatic ecosystems; it need not be comprehensively implemented. Standard stream gages plus crest gages were suggested for streams, whereas slotted wells and crest gages would work for wetlands.

3. Post Workshop

The narratives for several potential Vital Signs were revised based on comments received during the workshop, and a new one was written for T&E and Indicator Taxa. No participants indicated a strong interest in reviewing the workshop summary for tributary watersheds. Copies of the summary were sent to all participants.

Literature Cited

Brooks, R.P., C. Snyder, and M. M. Brinson. 2005. Conceptual model of tributary watersheds with associated wetlands and riparian areas. Unpublished manuscript. 38pp.

Table 1. ERMN candidate vital signs for consideration by the Tributary Watershed Working Group (*** = first tier priority, ** = second tier, * = third tier).

Level 1	Level 2	Level 3
Air and Climate	Air Quality	Air chemistry – wet and dry deposition (1)***
	Weather and Climate	Weather and Climate (4)***
Geology and Soils	Geomorphology	Stream / river channel Characteristics (7)***
Water	Hydrology	Surface water hydrology – Streams and rivers (13)***
		Wetland hydrology (14)***
	Water Quality	Water Quality – core Parameters (16)***
		Water Quality – expanded Parameters (17)***
Biological Integrity	Invasive Species	Invasive plants, animals, diseases – status & trends (18)**
	Focal species and communities	Riparian plant communities (28)***
		Riparian birds (29)**
		Riparian mammals (30)*
		Breeding birds (32)**
		Aquatic macroinvertebrates (39)***
		Aquatic periphyton (42)*
		Fish communities (44)**
		Vernal pool amphibians (46)**
		Streamside Salamanders (47)
	At risk biota – state and federal	Threatened, Endangered, and Indicator Species (49, 50)**
Ecosystem Pattern & Process	Land Cover / Land Use	Land cover / land use change (57)***
		Landscape pattern (58)***